

NEW MOSQUITO RECORDS AND NOTES ON THE HABITS OF CERTAIN SPECIES FROM CENTRAL NEW YORK.

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Culicella (*Culex*) *dyari* Coq.

According to Howard, Dyar and Knab (1915) this is a rare species, only single specimens being taken. Barber in 1910 collected at Wilmington, Mass., at arc lights, 107 males and 2 females (Dyar, *Ins. Ins. Mens.* 7:30, 1919). There is recorded but a single known specimen from New York. Dyar collected a single larva from Tupper Lake from which the adult issued on August 16, 1905.

During the past summer the writers found what appears to be a natural habitat of this species. Within the last two years there has been set aside a wild preserve of about eighty-three (83) acres, consisting of sphagnum bogs, marl ponds, wooded swamps and hills. There is a single deep pool known as Mud Pond and several small streams, while at one side flows a rather large creek. This is located near McLean, distant about eleven miles from Ithaca. This area lies above 1100 ft. contour line and the highest point within the area is 100 ft. Early last spring there was erected near Mud Pond a small open shelter for the purpose of protection during storms and to enable students to remain over night. On the first trip to this area (June 25, 1921) the writers found a large number (35) of what appeared to be a very striking, large, brown species of mosquito. These were all collected on the sides, underneath and within the shelter, both males and females being taken in about equal numbers. After a little study we decided the species belonged neither in *Culex* nor *Aedes*, but probably was a *Culiseta*. However no such species could be found described in *Culiseta*, so that our interest was aroused.

During the summer this species was under constant observation. Large numbers of the adults were seen in this shelter throughout June and July, the last large collection being made on July 18, (31 specimens). On September 4, no specimens

could be found. Although search was made throughout the summer in this area, not a single individual was obtained in any other location. Even sweeping failed to bring any to light although other species were obtained in abundance.

As only perfect specimens were obtained we thought the larvæ ought to be easily located in some of the nearby pools, bogs or streams. All these places were searched in vain, though numerous larvæ of other species were found. Dyar believes this species lays its eggs singly during the summer and they hatch the following spring with the melting of the snows. He states the larvæ mature early and there is but a single annual generation. All his records for collection are for May, except one taken at Tupper Lake, N. Y., on August 16, 1905, and Barber's collection in Massachusetts, in July, 1910. The interesting fact that only perfect specimens were found in our collecting would indicate either late maturing larvæ or a possible second generation. Gravid females were not found in the collection made on June 25, the first being obtained on July 9, and again on the 11th and 18th.

The adults are sluggish, resting quietly and easily captured by placing a small killing tube over them. The most interesting observation is their non-biting habit, at least as far as man is concerned. Several days and nights were spent in the shelter during both sunny and cloudy weather, but never once did this species offer to bite, though it was the predominant form there. Contrary to Barber's experience, they were not attracted to light, only two specimens being collected at the gasoline lantern used during the summer. About 150 specimens were collected, but this does not in any way represent the numbers present in and about the shelter.

Our doubt as to the identity of the species was kindly settled by Dr. H. G. Dyar, who exclaimed on being shown the specimens, "That is my namesake, *Culex dyari*!" He has now placed it in the genus *Culicella*, a genus intermediate between *Culex* and *Aedes*.

At the last moment, while examining larvæ collected on April 28, 1921, at Freeville, N. Y., for student use, we found a single specimen of *C. dyari*. This location is about two miles from what is described above as a natural habitat of this species. Furthermore, a single reared specimen of which we have the

last larval skin, pupal skin and adult, was also found in student material collected in swampy, grassy pools at Ringwood, N. Y., on May 10, 1921. This location is about six miles from the McLean habitat.

Aedes canadensis Theob.

This is one of the most common species of mosquitoes about Ithaca. It is generally believed that there is but a single generation each season, the overwintering eggs hatching at irregular intervals during the summer. Their normal habitat is woodland pools of a temporary character. The following observations would tend to show that there are more than one annual generation.

In our attempts to secure the larvæ of what proved to be *Culicella dyari*, we made two artificial pools on July 1st, in the sphagnum bogs at McLean. These pools were about 18 inches square and the water was from 10 to 15 feet deep. These bogs were dry on the surface when the openings were made. About 10 days later we found in these pools young larvæ which were remarkable on account of their blackish color. On July 18, nearly mature larvæ were found. These proved to be *A. canadensis*, not the unknown mosquito (*Culicella dyari*) as we had hoped. This would appear a new habitat for this species. The dark color of the larvæ was no doubt due to the decaying sphagnum which was eaten for food. The appearance of the species in these freshly made pools would seem to indicate that eggs were undoubtedly laid during mid-summer and hatched the same season.

The genus **Aedes**. Group **stimulans**.

Dyar (1920) has divided the genus *Aedes* into a number of groups, one of which is the *stimulans* group. During the past spring we made observations on three closely related species of *Aedes*—*A. stimulans* Walker, *A. excrucians* Walker (*abfitchii* F. & Y.) and *A. fitchii* F. and Y., all belonging to the *stimulans* group. Furthermore, Dyar considers each one of these to represent typically the three series into which he divides the *stimulans* group and around each are placed the known North American species according to their relationships.

While collecting larvæ on April 19, in the Renwick flats, at the head of Cayuga Lake, a single larva of *A. stimulans*

and two of *A. excrucians* were taken in a deep pool on open ground. The pool had a mud bottom covered with leaves. On April 21, Mr. Sibley brought in from Ringwood a great number of mature larvæ and pupæ. This material consisted of two species, *stimulans* and *excrucians* (*abfitchii*). A large number of isolations were made, but they proved difficult to rear under artificial conditions. However, seventeen adults were secured, the last larval and pupal skin being saved. These were all mounted and 5 proved to be *excrucians* and 12 *stimulans*. Of these we had 4 males of *excrucians* and 6 males of *stimulans*. Not a single *fitchii* larva was found in this collection. Mr. Sibley reported that these larvæ and pupæ were present in immense numbers.

On May 10, the writers visited Ringwood and located the pool described by Mr. Sibley. It was the last of three pools situated in the woods in a line back from the roadway at an elevation of about 1300 feet. The first pool was covered over by a dense mat of duckweed and in this no mosquito larvæ were found. The second pool which is of considerable size and depth, is evidently a pothole and is isolated from the other two. Practically no aquatic vegetation was present and the bottom and margins had a dense covering of decaying leaves and mud. Immense numbers of pupæ and relatively few larvæ were present along the edge and about floating tree trunks in the pool. None were found in the open water where it was deeper than three feet. The presence of such vast numbers was all the more surprising, as Mr. Sibley found none in it on April 21st. A greater surprise awaited us when we learned that this vast number of larvæ and pupæ in pool number two consisted of but a single species—a pure culture of *A. fitchii*.

Pool number three, which is similar but smaller than number two, did not contain at this time a single larva. It was in this pool that Mr. Sibley, eighteen days earlier, found such immense numbers of *A. stimulans* and *A. excrucians*.

These observations are of interest in showing an instance of two species, *A. stimulans* and *A. excrucians*, inhabiting but a single pool, even though a second pool of similar character is only a short distance away. Then a third very closely allied species, *A. fitchii*, occupies the second pool, to the exclusion of the one occupied by the first two species. Another point

of interest is the complete emergence of *A. stimulans* and *excrucians* at least two to three weeks earlier than *A. fitchii*, i. e., the pupal period of the former species was at its height about April 21, while the latter was on May 10.

These three species proved vicious biters and were the most troublesome, where they occurred, during the early spring months and lasting well into July.

***Mansonia perturbans* Walker.**

Mansonia perturbans is a mosquito of wide distribution. However there are only two published records from New York State—Rochester and Ithaca. The recorded material Ithaca was collected by Comstock in 1891. The writers have found only a single specimen in the Cornell collection bearing an Ithaca label, but no date. During the past summer this species has not been taken around Ithaca. On a trip made to North Fairhaven on July 3–5, this species was met with in large numbers. North Fairhaven lies on the shores of Lake Ontario and is surrounded by large swampy areas, providing ideal conditions for the development of this species.

This species maintained its reputation of being a vicious biter. It would bite freely in the woodlands during the day. In the evening they became extremely annoying in and around the house. Their attacks continued after dark, even after all lights were extinguished. One of the writers was compelled to change his sleeping place after 10:30 P. M. to a more protected room. This activity of the mosquito would indicate that this species is not entirely crepuscular in feeding habits as stated by Howard, Dyar and Knab. They also have a mean habit of attacking low down, crawling up inside one's trouser legs. It might be added that these experiences occurred at an isolated farm house about two miles from the village.

Swarming of the males was observed just at dusk, the individuals being barely discernible. The swarm was seen at the edge of a cattail pond, the height being from three to five feet. The swarm contained about thirty individuals, of which eight were captured.

***Anopheles quadrimaculatus* Say.**

This species has always been supposed to be a common one about Ithaca, breeding in large numbers in the marshy areas

at the head of Cayuga Lake. Early in the season we attempted to secure specimens for class use, but all collections made and adults reared proved to be *A. punctipennis* Say. This induced the writers to make a rather intensive survey of a considerable area bordering the city park located at the head of the Lake. A student spent a good part of his time locating pools, making collections and rearing adults. The writers also made extensive collections of larvæ and adult mosquitoes found in this area. What was our surprise to find that in all this material there was not a single individual of this species. The only specimens obtained during the season were collected in two private houses located on the heights about a mile distant from these marshes. In one house two females were obtained on August 15, and in November we collected two more in another private house.

Ithaca used to be considered a malarial city and numerous cases of this disease occurred every summer. In talking with the health officer, Dr. Crum, he informed us that not a single case was reported this past season and scarcely any for a number of years previously. One case came to our knowledge last summer and that person arrived in the city suffering from the disease. This is an interesting coincidence between the apparent disappearance of the chief malarial carrier of this region and the disease.

Anopheles punctipennis Say.

This is undoubtedly the dominant anopheline in the Ithaca region. It has been taken in large numbers wherever the writers collected. It proved one of the troublesome biters all season and the larvæ were collected in all sorts of locations. In the marshes the larvæ occurred in large numbers in a great variety of pools. Roadside puddles of a very temporary character often contained a much larger percentage of this species than any other. In puddles formed by local showers in wagon ruts this species was generally present, showing the great abundance of the species. Many rearings were made and in all cases only adults of this species were secured.

On the hills surrounding Ithaca it was very abundant and we were always sure to find them when collecting. If the human reservoir of malaria continued in Ithaca after the gradual disappearance of *A. quadrimaculatus* it is certain that *A. punctipennis* must be a poor host for the development of the malarial organisms in this region.

Anopheles walkeri Theobald.

This anopheline is widely distributed in Eastern North America, but is rarely taken or seen in collections. There are no records of it having ever been taken in New York State. On July 3, 1921, five specimens, while in the act of feeding, were collected at North Fair Haven. A single specimen was taken on August 5, at Duck Lake, while in the act of biting.

Wyeomyia smithii Coq.

Wyeomyia smithii Coq. is well known to be an obligate inhabitant of the pitcher plant (*Sarracenia purpurea*) and practically all that is necessary to get the mosquito is to find the plant.

Pitcher plants are well known to occur in New York State, but to date there have been no records published of the occurrence of the mosquito in our boundaries.

The sphagnum bogs of McLean, N. Y., contain numbers of pitcher plants and during June and July, when these plants were examined, many of the larvæ of this unique mosquito were found in them. Only plants containing an abundance of fluid, as yet uncontaminated by decaying insects, were inhabited.

The swamp lying close to Duck Lake, N. Y., is an excellent region for pitcher plants, where they flourish in great abundance. The larvæ of *Wyeomyia smithii* occur in great numbers, and during the middle of August, when this region was visited, large numbers of the larvæ could be obtained from the plants. The adults were also observed, flying amongst the low vegetation.

Successful rearings were easily obtained by isolating the larvæ in vials and using the fluid from the plants as the rearing medium.